Delayed food sensitivities, chronic inflammation and disease management

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Introduction

Chronic inflammatory diseases, such as hypertension, obesity, diabetes type 2, migraine, arthritis, asthma, hypothyroidism, IBS, IBD, and many more become more and more important with an ageing society. Beside the use of anti-inflammatory drugs, or other drugs designed to suppress specific symptoms, modern western medicine has little to offer to treat these diseases.

Chronic inflammation is considered as a common feature of all these diseases. The cause and/or the trigger of the chronic inflammation must be identified to allow any sustained treatment. Often the primary cause or incident, which lead to the inflammation, has disappeared, but inflammation is persistent. Two conditions are required for inducing chronic inflammation: presence of an antigen and the response of the immune system to the antigen.

Beside environmental triggers and moulds, food is the most important trigger that fulfils these requirements.

Immune response to food is mainly mediated by IgG, also referred to as type 3 allergy, in lesser extend by IgA and in rare cases by IgE (type 1 allergy). IgE leads to an acute response and can be ruled out as marker for chronic inflammation. IgA has a short lifetime. In most cases IgG mediated symptoms will be delayed, although anaphylaxis may also be induced by IgG (1). IgG is a persistent antibody and suitable for the identification of food causing chronic inflammation.

Methods

Specific IgG to 270 different foods have been assessed with an ELISA technique and measured with a certified IgG screening test called Imupro300. (Evomed Germany).

IgG Antibodies Against Food Antigens are Correlated with Inflammation and Intima Media Thickness in Obese Juveniles (2)

We determined IgG antibodies directed against food antigens, C-reactive protein (CRP) and the thickness of the intima media layer (IMT) of the carotid arteries in 30 obese children and in 30 normal weight children.

Results: Obese juveniles showed a highly significant increase in IMT (p = 0.0001), elevated CRP values (p=0.0001) and anti-food IgG antibody concentrations (p=0.0001) compared to normal weight juveniles. Anti-food IgG showed tight correlations with CRP (p = 0.001/r = 0.546) and IMT (p = 0.0001 / r = 0.513) and sustained highly significant in a multiple regression model.

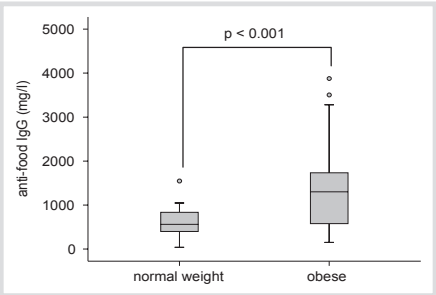

Fig. 1 Box and whiskers plot of serum anti-food IgG values in normal weight controls and obese juveniles. p two-tailed Student ' s t-test for unpaired samples.

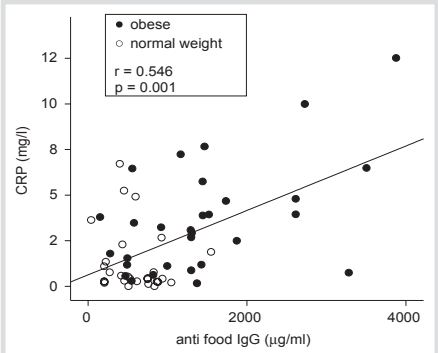

Fig. 2 Correlation between IgG antibodies against food antigens and CRP in normal weight (○) and obese (●) juveniles. r Pearson correlation coeff cient.

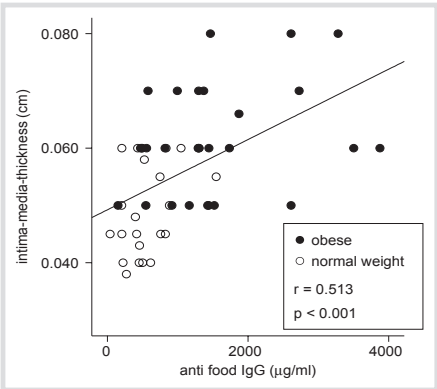

Fig. 3 Correlation between IgG antibodies against food antigens and the IMT of the common carotid arteries in normal weight (○) and obese (●) juveniles. r Pearson correlation coeff cient.

Conclusion: Obese children have significantly higher IgG antibody values directed against food antigens than normal weight children. Anti-food IgG antibodies are tightly associated with low-grade systemic inflammation and with the IMT of the common carotid arteries.

Diet Restriction in Migraine, based on IgG against Foods: A Clinical Double Blind, Randomised, Crossover Trial. (3)

We aimed to investigate the effect of diet restriction, based on IgG antibodies against food antigens on the course of migraine attacks in this randomised, double blind, cross-over, headache-diary based trial on 30 patients diagnosed with migraine without aura.
Following a 6-week baseline, IgG antibodies against 266 food antigens were detected by ELISA. Then, the patients were randomised to a 6-week diet either excluding or including specific foods with raised IgG antibodies, individually. Following a 2-week diet-free interval after the first diet period, the same patients were given the opposite 6-week diet (provocation diet following elimination diet or vice versa). Primary parameters were number of headache days and migraine attack count.

Results: The average count of reactions with abnormally high titre was 24 ± 11 against 266 foods. Compared to baseline, there was a statistically significant reduction in the number of headache days (from 10.5 ± 4.4 to 7.5 ± 3.7; P < 0.001) and number of migraine attacks (from 9.0 ± 4.4 to 6.2 ± 3.8; P < 0.001) in the elimination diet period.

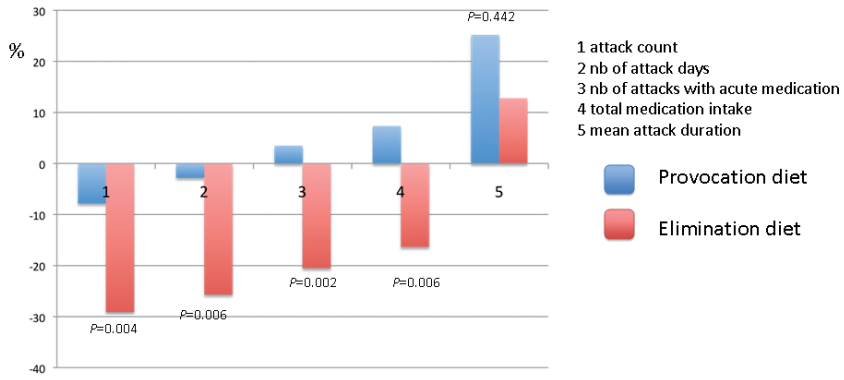

Fig. 4 Percentage difference between baseline, provocation diet and elimination diet

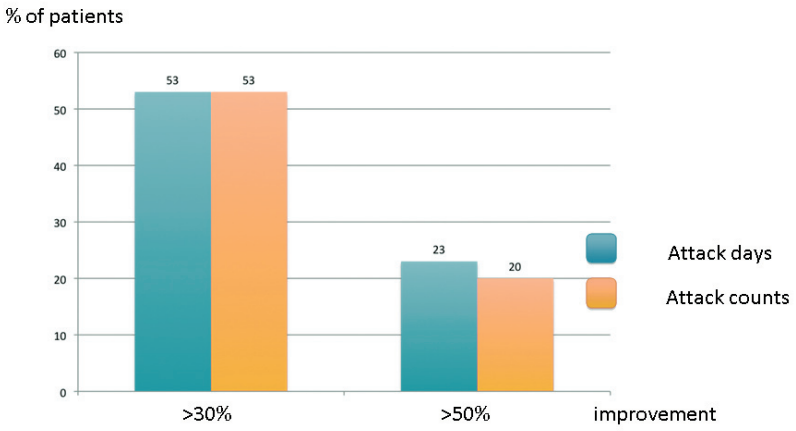

Fig. 5 Distribution of patients with more than 30% resp. 50% improvement from Baseline versus elimination

Conclusion: This is the first randomised, crossover study in migraineurs, showing that diet restriction based on IgG antibodies is an effective strategy in reducing the frequency of migraine attacks.

Clinical Relevance of IgG Antibodies against Food Antigens in Crohn's Disease:A Double Blind Crossover Diet Intervention Study. (4)

The clinical relevance of these food IgG antibodies was assessed in a double blind crossover study with 40 patients. Based on the IgG antibodies, a nutritional intervention was planned.

Results: The daily stool frequency significantly decreased by 11% during a specific diet compared with a sham diet. Abdominal pain reduced and general well being improved. IFN` secretion of T cells increased. No difference for eosinophil-derived neurotoxin in stool was detected.

Conclusion: a nutritional intervention diet based on circulating IgG antibodies against food antigens showed effects with respect to stool frequency, abdominal pain and general well-being in this double-blind cross-over study with 40 CD patients. Stool frequency and total score during the specific diet were significantly lower in contrast to the sham diet.

Changes in Fecal Calprotectin, Acute Phase Markers and Symptoms After Provocation by IgG Positive Foods in Crohn's Disease (5)

This study was designed to assess the role of foods, based on raised IgG antibodies on the clinical outcome and inflammation of CD. 8 patients (7 female and 1 male) with confirmed CD in remission who performed an elimination diet based on raised IgG antibodies for 6-30 months were enrolled the study. After a 10 days allergen free diet (IgG-neg food), challenge with up to 6 IgG-positive food was performed during 6 days. Objective measurements such as white blood cell and platelet count, highly sensitive C reactive protein (hCRP), erythrocyte sedimentation rate (ESR), ferritin as acute phase markers and fecal calprotectin (FC), considered as a biomarker of intestinal inflammation were assessed. Remission was determined by a disease activity assessment based on CDAI (Best).

Results: Significant increase in CDAI (Best) (p=0.012), FC (p=0.028), WBC (p= 0.036) and hCRP (p= 0.025) was observed after the provocation phase. Changes in PLT, ESR and Ferritin were not significant. Poor well-being and weakness, abdominal pain and distension, nausea and increase in stool frequency have been observed in most patients. 2 patients had to stop the challenge before the final day due to severe abdominal pain.

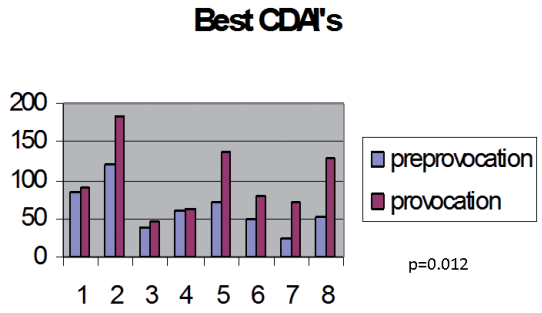

Fig. 6 Best Crohn's disease activity index (CDAI)

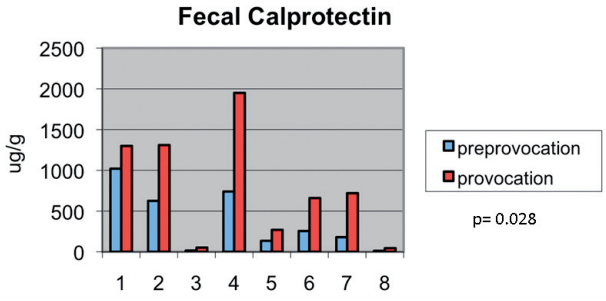

Fig. 7 Evolution of fecal Calprotectin

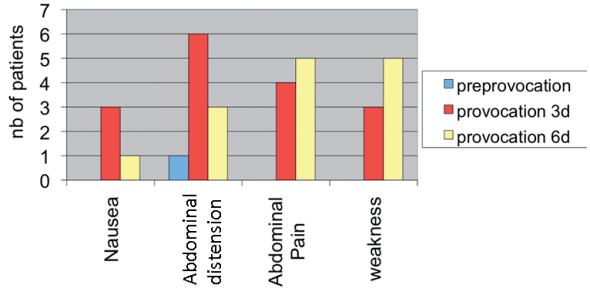

Fig. 8 appearance of symptoms during the provocation periods

Conclusion: This study is the first investigation, to show the increase of inflammation markers in patients with CD and deterioration of the clinical table by food challenge based on increased IgG levels. An IgG guided diet restriction may be beneficial in medical treatment of CD.

Conclusion

These data demonstrate the potential impact of food as trigger for chronic inflammation. IgG is a suitable marker to identify food causing chronic inflammation. In several observation studies, individual elimination diets guided by IgG have been shown to have a beneficial outcome in almost all chronic inflammatory disease. Although further studies are needed to provide more evidence and establish this approach in daily medical practice.

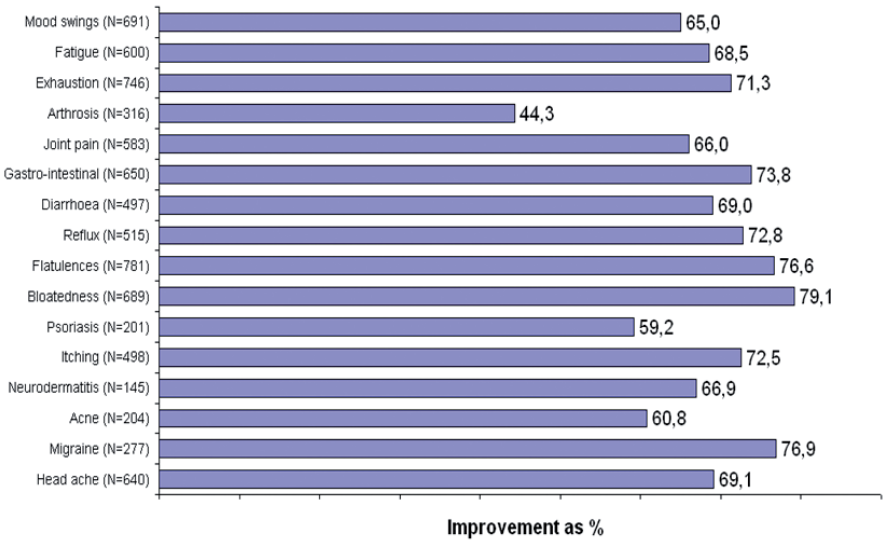

Fig. 9 Improvement of symptoms (%) following an IgG guided elimination diet after 8 weeks

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